I. Introduction

Why Organize Around Watersheds?

Watersheds are natural ecological systems containing land, water, plants, animals, and humans. All of the land that drains to the outlet of a lake, stream, or ocean is located within one watershed, and all land is located in one watershed or another. Unlike arbitrary political boundaries, watershed boundaries are delineated by the natural contours of the land and the flow of water. Water from snowmelt and rainfall flow from the high elevation boundaries of a watershed into lower elevations containing streams, lakes, oceans and other water bodies.

People are accustomed to dividing land into areas defined by man-made state and municipal boundaries. Traditional land and resource planning is organized around these city, town, and state borders. Increasingly, however, people are finding it makes more ecological sense to plan resource management around watershed boundaries. Today's most pressing environmental problems are more interconnected and complex than in the past. By treating a watershed ecosystem as an integrated whole, cumulative impacts of population and growth can be more adequately addressed. Planning around a watershed requires an understanding of how all the organisms and activities within it are connected.

The Rhode Island Watershed Partnership: Making Connections

Some of the underlying concepts that guide the Rhode Island Watershed Partnership include:

The land within a watershed has a natural connection to the water within its boundaries. When an activity takes place on the land, the water draining down the land is affected. The condition and quality of water at any point in a waterbody is directly related to activities that take place on the surrounding land.

Activities upstream have a direct impact on water quality downstream. As water flows across land and into streams and rivers, it carries pollutants along the way. The collective effects of harmful activities carried out miles upstream affect downstream communities. Rather than evaluating each negative impact separately, it is necessary to consider the cumulative impacts of these point and non-point source pollutants.

Watersheds connect communities across man-made boundaries. Because watersheds do not stop at town or state lines, residents and business people in different states and municipalities need to work together to achieve effective resource management.

Human land use decisions are connected to water quality and watershed health. How land is used- where open space is protected, how land is zoned, where industrial sites are permitted, how landfills are used and managed- has a direct and measurable impact on water quality.

Human quality of life and economic health is directly linked to environmental health. People depend on the environment for their drinking water, food, recreation and livelihood. Within

watersheds are homes, schools, and businesses. When natural resources within the watershed are degraded, the problem not only impacts the environment, but also affects quality of life and the economy.
The decisions we make today impact the future. Human actions can have long-lasting effects on the environment. The results of poor land and water use decisions may take generations to detect and repair. Conversely, careful planning and organized management can help shape the future for the common good.

The Rhode Island Watershed Partnership recognizes these connections, and attempts to address environmental management issues by planning around watershed ecosystems. This innovative approach is based on an understanding that local people's interests in land and water should be linked to decisions that affect these resources. Natural resource management is greatly enhanced by the involvement and collaboration of a wide range of people living and working in the watershed. The Watershed Partnership brings people together-local residents, businesses, town officials, and state and federal representatives- to more effectively coordinate programs, tools, and resources in order to support the sustainability of the watershed and all who live, work, and play within it.

The Rhode Island Watershed Partnership is not a new regulatory program. Instead, it is a new way of organizing existing programs and efforts that focuses on the power of stakeholder involvement and collaboration. The approach is based on two premises: that organizations and people who collaborate can be more effective than groups that work alone, and that local stakeholder interests should guide environmental management and protection The benefits of the Watershed Approach are numerous:

Benefits for Local Residents:
-Watershed partnerships build trust and enhance working relationships, providing a neutral forum where various interests can be addressed.
-Watershed partnerships help stakeholder groups target and pool together technical and financial resources.
-Through collaborative grant writing and program design, partner organizations have greater access to competitive funding sources.

Benefits for State and Federal Agencies:
-The Watershed Partnership enhances government's ability to solve complex problems associated with the cumulative effects of non-point source pollution.
-Heightened communication fostered by watershed partnerships helps expand the scope and quality of information available for government decision-making. Consequently, state and local government can more effectively coordinate and implement existing programs, and build on past efforts with creative new initiatives.

Generating an Action Plan for the Salt Ponds Region

The items that make up the following action plan for the Salt Ponds Region emerged out of project plans of ongoing efforts and the problem identification process of the Salt Ponds Coalition – the primary non-governmental, citizen group in the area. Several major efforts are underway in the Salt Ponds Region that will continue over the timeframe of this phase of the Salt Ponds Action Plan, or three years. *Water quality restoration plans* for Green Hill and Ninigret Ponds are being prepared by RIDEM. The *Block Island and Green Hill Pond On-site Wastewater Demonstration Project Description* is well into its second year. The *South Shore Habitat Restoration Project* is in the final phase and restoration efforts will continue for the next two years. In addition, the Salt Ponds Coalition, through its involvement in these projects and its ongoing stewardship of the coastal ponds, have identified important issues that they would like to encourage their members and partnering organizations to focus on in the upcoming years.

The considerable efforts mentioned above bring together local, state and federal agencies, watershed organizations and concerned citizens to work on many diverse environmental issues, in and around the Salt Ponds. Naturally, partnerships form and efforts are coordinated to maximize local support and energy. The action plan, however, provides a written account of the works-in-progress as well as the issues of immediate concern that deserve the attention of stakeholders in the Salt Ponds Region.

Partners

Towns of Charlestown, Narragansett, South Kingstown and Westerly
Salt Ponds Coalition
South County Conservancy
Washington County Regional Planning Council
University of Rhode Island
CRC/Sea Grant
Coastal Resources Management Council
RIDEM
RIDOH
RIDOT
RIDOA-Statewide Planning Program
US Army Corps. of Engineers
U.S. Fish and Wildlife
Natural Resources Conservation Service
South Rhode Island Conservation District

II. Existing Watershed Conditions

The Salt Ponds Region, comprised of portions of Westerly, Charlestown, South Kingstown, and Narragansett Indian lands, runs along most of Rhode Island's south shore. It includes several large coastal salt ponds and some brackish ponds, from west to east: Winnapaug Pond, Quonochotaug Pond, Ninigret Pond, Green Hill Pond, Trustom Pond (*brackish*), Card Ponds

(*brackish)*, Potter Pond and Point Judith Pond. Land use in the watershed is primarily residential, with the heaviest concentrations of development occurring along the coastlines of the ponds.

Brief Overview of Water Quality

Green Hill Pond and Ninigret Pond, two salt ponds located in southern Rhode Island, have been identified by DEM as being impaired by pathogens (i.e., bacteria). Teal and Factory Brook, tributaries to Green Hill Pond, have also been identified as being impaired by pathogens. During the summer of 1999, DEM staff carried out preliminary water quality monitoring in the ponds, as well as the two tributaries. Dry and wet weather monitoring continued in 2000, and a public meeting was held in August to present the information collected so far to interested stakeholders. Two more wet weather surveys are planned for the spring/summer of 2001. The data will be used to support the development of a restoration plan, known as a Total Maximum Daily Load (TMDL), for the two ponds and freshwater streams. The goal of the TMDLs is the eventual reopening of the ponds to shellfishing. DEM has partnered with the Salt Ponds Coalition and the University of Rhode Islands Cooperative Extension to enhance public awareness of water quality issues and to support the voluntary inspection and maintenance of septic systems that may impact water quality in the ponds. URI is also providing DEM with technical assistance and landuse pollution risk maps to support TMDL development.

III. Action Plan

TOPIC: Water Quality

GOALS: Clean and Plentiful Water. Fishable/Swimmable surface water bodies.

ISSUE I:	Excessive levels of pathogens impair Green Hill and Ninigret Ponds including (Teal Pond and Factory Pond Streams). Green Hill Pond has been closed to shellfishing since 1993.

Objective 1: Restore the Green Hill and Ninigret Ponds including (Teal Pond and Factory Pond Streams).

Strategy 1.1: Complete water quality restoration plans (TMDLs) to address elevated bacteria concentrations for Green Hill and Ninigret Pond including (Teal Pond and Factory Pond Streams) and implement the plan's recommended strategies.

Activities:

1.1.1 Develop pathogen TMDL's for study area.
1.1.2 Water quality monitoring to include 3 dry weateher surveys and 1 wet weather survey.

1.1.3 Utilize optical brightening techniques to help differentiate between human and non0human sources of bacterial pollution.Complete TMDLs for pathogens.

Objective 2: Establish sustainable, onsite wastewater management programs for the Green Hill Pond watershed (*Objective 2, Strategy 2.1 and Activities were taken from the* Block Island and Green Hill Pond On-site Wastewater Demonstration Project Description).

Strategy 2.1: Prevent degradation of water quality and protect the watershed by using enhanced septic system technologies coupled with septic system maintenance requirements.

Activities:

2.1.1 Repair, upgrade or retrofit onsite wastewater systems in the towns of Charlestown and South Kingstown.
2.1.2 Institute septic system standards, inspection and installation procedures, and pump out and repair requirements tailored to the watershed.
2.1.3 Develop monitoring procedures that measure the impact of the upgraded systems on ground and surface water quality.
2.1.4 Provide educational materials for local audiences.

ISSUE II: Surface water and groundwater quality in the Salt Ponds is threatened by many point and nonpoint sources. With limited resources to monitor and to react to water quality threats in all of the coastal ponds, a strategic approach is required to target existing resources.

Objective 3 – Create and implement a cost effective, efficient water quality monitoring strategy for the Salt Ponds.

Strategy 3.1: Identify and allocate water quality monitoring resources to provide most efficiently the information that will be most useful in pollution prevention and enforcement efforts.

Activities:

3.1.1 Convene a committee to design a targeted water quality monitoring strategy for the Salt Ponds that is realistic given available resources.
3.1.2 Assign responsibility for the highest priority sampling areas.
3.1.3 Sample, analyze, interpret and report results on a website in a timely fashion.
3.1.4 Where results demonstrate a water quality impact, report directly to the agency with responsibility for remediation.

Strategy 3.2: Begin development of TMDL (water quality restoration plan) for Pt. Judith Pond.

Activities:

3.2.1 Conduct dry and wet weather sampling to determine potential pollution sources to Pt. Judith Pond.

ISSUE III:	Samples from private drinking water wells have been found to contain fecal coliform bacteria and nitrates.

Objective 4: Ensure safe and adequate drinking water for residents in the Salt Ponds region.

Strategy 4.1: Increase public awareness about groundwater and the protection of groundwater quality.

Activities:

4.1.1 Towns establish and coordinate guidelines/ordinances to establish well water quality standards and periodic testing to insure proper quality.

4.1.2 Educate all well users and the public to understand water recycling, the importance of septic system maintenance and its relationship to water quality of well water.

ISSUE IV:	Sedimentation basins, designed to trap sand as it surges through the Ninigret, Quonochontaug and Winnapaug Ponds, have not been adequately maintained since breachway construction. Tidal sand deltas have formed inside the breachways. The shifting sand has killed aquatic vegetation that once sustained fertile fish and shellfish breeding areas.

Objective 5: Restore once productive, now damaged, habitats in the breachway tidal deltas of Ninigret, Wuonochontaug and Winnapaug Ponds using a combination of choices that include planting, seeding and sand removal. To restore, as well, fish passage in the salt pond tributaries leading to Cross Mills Pond and Factory Pond. (Taken from the 'South Shore Habitat Restoration Project Fact Sheet' courtesy of the RI CRMC, January 2000).

Strategy 5.1: Using different combinations of dredging, planting and seeding at each established restoration site to capture sediments, plant eelgrass and restore habitat.

Activities:

5.1.1 *Reconnaissance Phase*- Determine that selective dredging and planting will have a beneficial effect on tidal delta habitats and fish passage will benefit anadromous fish.

5.1.2 *Feasibility Phase*- Study all aspects of tidal delta evolution and habitat alteration, the value of present habitats and the impacts those restoration alternatives might have on these existing habitats. Selection of areas to be restored and alternatives to be used will be determined in this phase. Fish passage engineering designs will be completed.

5.1.3 *Restoration Phase*- Restoration will begin at sites determined in earlier phases. The state must commit funding for a long-term breachway maintenance plan before any restoration work begins.

Objective 1: Restore the Green Hill and Ninigret Pond including (Teal Pond and Factory Pond Streams)

Activity	*Action*	*Responsible Parties*	*Funding Source*	*Time period*	*Status*	*Focus Area*	*Contact Person*	*Contact Phone*	*Contact Email*
Strategy 1.1: Complete water quality restoration plans (TMDLs) to address elevated bacteria concentrations for Green Hill and Ninigret Pond including (Teal Pond and Factory Pond Streams) and implement the plan's recommended strategies.									
1.1.1	Develop pathogen TMDL's for study area.	RIDEM	RIDEM, EPA	Completed by January 2002		Green Hill and Ninigret Ponds	Brian Zalewsky	222-4700x7145	bzalewsk@dem.state.ri.us
1.1.2	Water quality monitoring to include 3 dry weateher surveys and 1 wet weather survey.	RIDEM	RIDEM, EPA	Summer/Fall 2001		Green Hill and Ninigret Ponds	Brian Zalewsky	222-4700x7145	bzalewsk@dem.state.ri.us
1.1.3	Utilize optical brightening techniques to help differentiate between human and non0human sources of bacterial pollution.	RIDEM	RIDEM, EPA	Summer/Fall 2001		Green Hill and Ninigret Ponds	Brian Zalewsky	222-4700x7145	bzalewsk@dem.state.ri.us
Objective 2: Establish sustainable, onsite wastewater management programs for the Green Hill Pond watershed.									
Strategy 2.1: Implement a planned approach to watershed-based, on-site wastewater management.									
2.1.1	Repair, upgrade or retrofit onsite wastewater systems in the towns of Charlestown and South Kingstown.	URI-CEWQ	RI CSSLP, EPA	April 1, 2000-March 31, 2004	Project Year 2 began in April	Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.1	Construct up to 10 additional demonstration systems in 2001-2002.	URI-CEWQ	EPA	April 2001 - 2002		Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.2	Introduce septic system standards, inspection and installation procedures, and pump out and repair requirements tailored to each watershed.	URI-CEWQ	EPA (319)	April 1, 2000-March 31, 2004	Project Year 2 began in April	Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.2	Recommend treatment standards for Green Hill; conduct neighborhood repair feasibility study.	URI-CEWQ	EPA (319)	April 2001 - 2002		Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.2	Accelerate inspectons in priority areas with student support.	URI-CEWQ	EPA (319)	April 2001 - 2002		Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.3	Develop monitoring procedures that measure the impact of the upgraded systems on ground and surface water quality.	URI-CEWQ	EPA (319)	April 1, 2000-March 31, 2004	Project Year 2 began in April	Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.3	Continued system performance and water quality monitoring.	URI-CEWQ	EPA	April 1, 2000-March 31, 2004	Project Year 2 began in April	Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.4	Provide educational materials for local audiences.	URI-CEWQ	EPA (319)	April 1, 2000-March 31, 2004	Project Year 2 began in April	Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.4	Expand public education to support South Kingstown ordinance adoption.	URI-CEWQ, CRMC	EPA	April 2001 - 2002		Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu
2.1.5	Training and technical support for town staff and others.	URI-CEWQ, CRMC	EPA	April 2001 - 2002		Green Hill Pond	Lorraine Joubert	401-874-4518	ljoubert@uri.edu

Objective 3: Create and implement a cost effective, efficient water quality monitoring strategy for the Salt Ponds.									
Strategy 3.1: Identify and allocate water quality monitoring resources (e.g. Pond Watcher Program) to provide most efficiently the information that will be most useful in pollution prevention and									
3.1.1	Convene a committee to design a targeted water quality monitoring strategy for the Salt Ponds that is realistic given available resources and ongoing efforts, such as the Pond Watchers.	Salt Ponds Coalition, CRMC		Fall - Winter 2001		Salt Ponds	Vic Dvorak	(401) 322-3068	saltpondscoalition@hotmail.com
3.1.1	Compile and review existing PondWatcher water quality data as a baseline for planning future monitoring activities.	Committee: RIDEM, URI-CEWQ, Salt Ponds Coalition, CRMC, USGS, towns		Fall - Winter 2001	New activity	Salt Ponds	Vic Dvorak; Jeff Nield	222-3434x4405: (401) 322-3068	jnield@dem.state.ri.us: saltpondscoalition@hotmail.com
3.1.3	Assign responsibility for the highest priority sampling areas as designated by the TMDL.	Committee: RIDEM, URI-CEWQ, CRMC, Salt Ponds Coalition, USGS, towns	n/a	Winter 2001	The monitoring committee will allocate responsibility no later than December 2001 - in time for winter storm-drain sampling and for reassignment of Watershed Watch sites.	Salt Ponds	Vic Dvorak; Jeff Nield	222-3434x4405: (401) 322-3069	jnield@dem.state.ri.us: saltpondscoalition@hotmail.com
3.1.4	Sample, analyze, interpret and report results on a website in a timely fashion.	Committee: RIDEM, URI-CEWQ, EPA, Salt Ponds, USGS, towns	RIDEM, URI, EPA	Sampling will continue indefinitely.	Reports should be posted no more than two weeks after results are available.	Salt Ponds	Dependent on results of monitoring.		
3.1.5	Where results demonstrate a water quality impact, report directly to the agency with responsibility for remediation.	RIDEM, URI-CEWQ, Salt Ponds, USGS, CRMC, towns, RIDOT	various			Salt Ponds	Dependent on results of monitoring.		
Strategy 3.2: Begin development of TMDL (water quality restoration plan) for Pt. Judith Pond.									
3.2.1	Conduct dry and wet weather sampling to determine potential pollution sources to Pt. Judith Pond.	RIDEM, Salt Ponds Coalition, Town of Narragansett and S.K.	RIDEM		Begin 2002	Pt. Judith Pond	Wayne Jenkins	401-222-4700	wjenkins@dem.state.ri.us
Objective 4: Ensure safe and adequate drinking water for residents in the Salt Ponds region.									
Strategy 4.1: Increase public awareness about groundwater and the protection of groundwater quality.									
4.1.1	Towns establish and coordinate guidelines/ordinances to establish well water quality standards and periodic testing to insure proper quality.	Towns of Westerly, Charlestown and South Kingstown, Salt Ponds Coalition, RIDEM	319		New activity		Roger Pease (Charlestown)		
4.1.2	Educate all well users and the public to understand water recycling, the importance of septic system maintenance and its relationship to water quality of well water.		319		New activity				

Objective 5: Restore once productive, no\

Strategy 5.1: Using different combinations of dredging, planting and seeding at each established restoration site to capture sediments, plant eelgrass and restore habitat.

Activity	*Action*	*Responsible Parties*	*Funding Source*	*Time period*	*Status*	*Focus Area*	*Contact Person*	*Contact Phone*	*Contact Email*
5.1.1	**Reconnaissance Phase-** Determine that selective dredging and planting will have a beneficial effect on tidal delta habitats and fish passage will benefit anadromous fish.	ACOE, CRMC, RIDEM, URI/GSO, URI Geology and Natural Resource Sciences	ACOE, CRMC, RIDEM, Westerly, Charlestown, South Kingstown	Completed in June 1998	Complete	Ninigret, Quonochontaug and Winnapaug Ponds	Laura Ernst, CRMC	401-783-3370	l_ernst@crmc.state.ri.us
5.1.2	**Feasibility Phase-** Study all aspects of tidal delta evolution and habitat alteration, the value of present habitats and the impacts those restoration alternatives might have on these existing habitats. Selection of areas to be restored and alternatives to be used will be determined in this phase. Fish passage engineering designs will be completed.	ACOE, CRMC, RIDEM, URI/GSO, URI Geology and Natural Resource Sciences	ACOE, CRMC, RIDEM, Westerly, Charlestown, South Kingstown	Completed Summer 2000	Complete	Ninigret, Quonochontaug and Winnapaug Ponds	Laura Ernst, CRMC	401-783-3371	l_ernst@crmc.state.ri.us
5.1.3	**Restoration Phase-** Restoration will begin at sites determined in earlier phases. The state must commit funding for a long-term breachway maintenance plan before any restoration work begins.	ACOE, CRMC, RIDEM, URI/GSO, URI Geology and Natural Resource Sciences	ACOE, CRMC, RIDEM, Westerly, Charlestown, South Kingstown	Restoration phase will take about 2 years to complete.	Start Date ???	Ninigret, Quonochontaug and Winnapaug Ponds	Laura Ernst, CRMC	401-783-3372	l_ernst@crmc.state.ri.us